CLAIMS

1   1.   Apparatus for reassigning string codes in a data
compressor that compresses an input stream of data
characters into an output stream of compressed codes,
comprising

5   a plurality of coincidence elements corresponding
to a respective plurality of codes to be assigned to
strings, a string being comprised of a prefix string
of at least one of said data characters followed by an
extension character, a prefix string having a prefix
10   code associated therewith,

                a coincidence element providing a coincidence
output and having a prefix code input and a character
input for enabling the coincidence element to energize
the coincidence output thereof upon coincidental
15   energization of the inputs thereof so that energization
of a coincidence output of a coincidence element provides
a representation of the code corresponding thereto,

                first coupling means for selectively coupling
the representations of codes corresponding to the
20   coincidence elements to the prefix code inputs of the
coincidence elements,

                second coupling means for selectively coupling
representations of data characters fetched from said
input stream to the character inputs of the coincidence
25   elements,

                means for recording extended strings in said
coincidence elements, an extended string comprising a
longest matching string extended by the data character
following said longest matching string, and
30   means for reassigning a coincidence element to
an extended string to be recorded when further codes
are unavailable for assignment.

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1   2.   The apparatus of claim 1 wherein said first coupling means comprises means for selectively coupling the coincidence outputs of the coincidence elements to the prefix code inputs of the coincidence elements.

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  3.   The apparatus of claim 2 wherein said means for reassigning comprises means for reassigning a particular coincidence element to an extended string to be recorded if the coincidence output of said particular coincidence

10   element is not coupled to the prefix code input of another coincidence element.

  4.   The apparatus of claim 2 wherein said means for reassigning comprises means for reassigning a particular

15   coincidence element to an extended string to be recorded if the coincidence output of said particular coincidence element is not coupled to the prefix code input of another coincidence element through said first coupling means

20   5.   The apparatus of claim 3 wherein said means for reassigning includes
         means for selectively applying enable signals to the inputs of said coincidence elements so that if said coincidence output of said particular coincidence

25   element is coupled to the prefix code input of another coincidence element, said another coincidence element is enabled, and
         means for determining if said another coincidence element is enabled.

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1   6.   The apparatus of claim 3 wherein said means for reassigning includes

        means for applying enable signals to the prefix code and character inputs of said particular coincidence

5   element,

        means for selectively applying enable signals to the character inputs of further coincidence elements so that if the coincidence output of said particular coincidence element is coupled to the prefix code input

10   of another coincidence element, said another coincidence element is enabled, and

        means for determining if said another coincidence element is enabled.

15   7.   The apparatus of claim 3 wherein said means for reassigning includes

        means for applying enable signals to the prefix code and character inputs of said particular coincidence element through said first and second coupling means,

20   respectively,

        means for selectively applying enable signals through said second coupling means to the character inputs of further coincidence elements so that if the coincidence output of said particular coincidence element is coupled

25   to the prefix code input of another coincidence element, said another coincidence element is enabled, and

        means for determining if said another coincidence element is enabled.

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1   8.   The apparatus of claim 6 wherein said means for reassigning includes

        means for decoupling connections in said first and second coupling means of said prefix code and
5   character inputs, respectively, of said particular coincidence element, if said coincidence output of said particular coincidence element is not coupled to the prefix code input of another coincidence element, so that said particular coincidence element can be reassigned
10 to said extended string to be recorded.

     9.   The apparatus of claim 6 further including

        means for assigning levels to said coincidence elements, a level assigned to a coincidence element
15 indicative of the number of characters of a string recorded thereby,

        said further coincidence elements having an assigned level that is one level greater than the level assigned to said particular coincidence element.

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     10.   The apparatus of claim 7 wherein said data compressor further includes

        means for fetching a plurality of data characters from said input stream and applying said fetched
25 characters to said second coupling means so as to enable a coincidence element corresponding to a code assigned to a string that is the longest match to said plurality of data characters, and

        means for outputting the code of said longest
30 matching string, thereby providing said stream of compressed codes.

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1   11.   The apparatus of claim 10 wherein
said first coupling means is operative for
coupling the representation of the code assigned to said
longest matching string to the prefix code input of the
5   coincidence element corresponding to the next code to
be assigned to a string, and
said second coupling means is operative for
coupling the representation of the fetched data character
following said longest matching string to the character
10   input of said coincidence element corresponding to said
next code to be assigned,
so as to record, in said coincidence element
corresponding to said next code, an extended string
comprising the prefix string having the code of said
15   longest matching string and the extension character
comprising said data character following said longest
matching string, thereby assigning said next code to
said extended string.

20   12.   The apparatus of claim 9 wherein said means for
assigning levels includes
a code and level assignment table having locations
for storing codes corresponding to said coincidence
elements and the levels assigned thereto.
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13.   The apparatus of claim 1 wherein said plurality
of coincidence elements comprises a matrix of AND-gates.

14.   The apparatus of claim 11 wherein said first
30   coupling means comprises prefix code switch means for
selectively coupling the coincidence outputs of the
coincidence elements to the prefix code inputs thereof.

15.   The apparatus of claim 14 wherein said prefix
35   code switch means comprises a matrix switch.

16.   The apparatus of claim 14 wherein said first
coupling means further includes

a code decoder responsive to the first character
of a string under test for providing a plurality of
outputs corresponding to respective character values,
a unique decoder output being energized in accordance
with the character value of said first character,

said outputs of said code decoder providing
representations of codes corresponding to said character
values to said prefix code switch means.

17.   The apparatus of claim 11 wherein said second
coupling means includes character switch means for
selectively coupling said representations of data
characters to the character inputs of the coincidence
elements.

18.   The apparatus of claim 17 wherein said character
switch means comprises a matrix switch.

19.   The apparatus of claim 17 wherein said data
characters are from an alphabet of data characters and
wherein said second coupling means includes

a plurality of character decoders responsive
respectively to said plurality of fetched characters,
each character decoder providing a plurality of outputs
corresponding to the respective characters of said
alphabet, a unique decoder output being energized in
accordance with the character applied to the character
decoder,

the outputs of said plurality of character decoders
providing said representations of data characters to
said character switch means.

1 20.   The apparatus of claim 19 wherein said means
for fetching comprises

     an input buffer for holding said plurality of
data characters fetched from said input stream and for
5 applying said fetched characters to said character
decoders, respectively, and

     means for shifting said plurality of data
characters in said input buffer so that the fetched data
character following said longest matching string is
10 shifted to a first stage of said input buffer so as to
provide the first character of a next longest match.

     21.   The apparatus of claim 11 further including

     means for assigning levels to said coincidence
15 elements, a level assigned to a coincidence element
indicative of the number of characters of a string
recorded thereby, and

     wherein said means for fetching comprises an
input buffer for holding said plurality of data characters
20 fetched from said input stream,

     the level assigned to the coincidence element
corresponding to said longest matching string being
indicative of the stage of said input buffer holding
said fetched data character following said longest
25 matching string.

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1 22.   The apparatus of claim 20 further including means
for assigning levels to said coincidence elements, a
level assigned to a coincidence element indicative of
the number of characters of a string recorded thereby,

5   said further coincidence elements having an
assigned level that is one level greater than the level
assigned to said particular coincidence element,

the level assigned to said further coincidence
elements being indicative of particular inputs of said

10 character switch means that are coupled to said character
inputs of said further coincidence elements,

said enable signals applied to said character
inputs of said further coincidence elements being applied
through said particular inputs of said character switch

15 means.

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1   23.   A method for reassigning string codes in a data compressor that compresses an input stream of data characters into an output stream of compressed codes, comprising

5   providing a plurality of coincidence elements corresponding to a respective plurality of codes to be assigned to strings, a string being comprised of a prefix string of at least one of said data characters followed by an extension character, a prefix string having a prefix

10 code associated therewith,

       a coincidence element providing a coincidence output and having a prefix code input and a character input for enabling the coincidence element to energize the coincidence output thereof upon coincidental

15 energization of the inputs thereof so that energization of a coincidence output of a coincidence element provides a representation of the code corresponding thereto,

       selectively coupling through first coupling means, the representations of codes corresponding to the

20 coincidence elements to the prefix code inputs of the coincidence elements,

       selectively coupling through second coupling means, representations of data characters fetched from said input stream to the character inputs of the

25 coincidence elements,

       recording extended strings in said coincidence elements, an extended string comprising a longest matching string extended by the data character following said longest matching string, and

30   reassigning a coincidence element to an extended string to be recorded when further codes are unavailable for assignment.

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1   24.   The method of claim 23 wherein said step of selectively coupling through first coupling means comprises

        selectively coupling, through first coupling
5   means, the coincidence outputs of the coincidence elements to the prefix code inputs of the coincidence elements.

  25.   The method of claim 24 wherein said reassigning step includes reassigning a particular coincidence element
10   to an extended string to be recorded if the coincidence output of said particular coincidence element is not coupled to the prefix code input of another coincidence element.

15   26.   The method of claim 25 wherein said reassigning step includes

        selectively applying enable signals to the inputs of said coincidence elements so that if said coincidence output of said particular coincidence element is coupled
20   to the prefix code input of another coincidence element, said another coincidence element is enabled, and

        determining if said another coincidence element is enabled.

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1   27.   The method of claim 25 wherein said reassigning
step includes

        applying enable signals to the prefix code and
character inputs of said particular coincidence element,

5   selectively applying enable signals to the
character inputs of further coincidence elements so that
if the coincidence output of said particular coincidence
element is coupled to the prefix code input of another
coincidence element, said another coincidence element

10 is enabled, and

        determining if said another coincidence element
is enabled.

    28.   The method of claim 27 wherein said reassigning
15 step includes

        decoupling connections in said first and second
coupling means of said prefix code and character inputs,
respectively, of said particular coincidence element,
if said coincidence output of said particular coincidence

20 element is not coupled to the prefix code input of another
coincidence element, so that said particular coincidence
element can be reassigned to said extended string to
be recorded.

25 29.   The method of claim 27 further including
        assigning levels to said coincidence elements,
a level assigned to a coincidence element indicative
of the number of characters of a string recorded thereby,
        said further coincidence elements having an

30 assigned level that is one level greater than the level
assigned to said particular coincidence element.

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1   30.   The method of claim 27 wherein said data
compressor is operative for
        fetching a plurality of data characters from
said input stream and applying said fetched characters
5   to said second coupling means so as to enable a
coincidence element corresponding to a code assigned
to a string that is the longest match to said plurality
of data characters, and
        outputting the code of said longest matching
10 string, thereby providing said stream of compressed codes.

  31.   The method of claim 30 further including
        coupling, through said first coupling means,
the representation of the code assigned to said longest
15 matching string to the prefix code input of the
coincidence element corresponding to the next code to
be assigned to a string, and
        coupling, through said second coupling means,
the representation of the fetched data character following
20 said longest matching string to the character input of
said coincidence element corresponding to said next code
to be assigned,
        so as to record, in said coincidence element
corresponding to said next code, an extended string
25 comprising the prefix string having the code of said
longest matching string and the extension character
comprising said data character following said longest
matching string, thereby assigning said next code to
said extended string.
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  32.   The method of claim 23 wherein the step of
providing said plurality of coincidence elements comprises
providing a plurality of AND-gates.

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1   33.   The method of claim 31 wherein said fetching
step includes
            utilizing an input buffer for holding said
plurality of data characters fetched from said input
5   stream, and
            shifting said plurality of data characters in
said input buffer so that the fetched data character
following said longest matching string is shifted to
a first stage of said input buffer so as to provide the
10 first character of a next longest match.

    34.   The method of claim 31 further including
            assigning levels to said coincidence elements,
a level assigned to a coincidence element indicative
15 of the number of characters of a string recorded thereby,
and
            wherein said fetching step comprises utilizing
an input buffer for holding said plurality of data
characters fetched from said input stream,
20   the level assigned to the coincidence element
corresponding to said longest matching string being
indicative of the stage of said input buffer holding
said fetched data character following said longest
matching string.
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